

NASA Cost Estimating Symposium

Ground Systems Data Collection/ Modeling Update

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Ground Systems Data Collection/ Modeling Team

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Data Collection: Results to Date

- Phase I, II & III Project Cost Data
 - I: SAMPEX, FUSE, ACE, XTE
 - II: FAST, SWAS, WIRE, TRACE
 - III: LANDSAT-7, EO-1

Data Collection: Work in Progress

- Phase IV: Project Cost Data
 - TERRA (Formerly EOS AM-1)
 - ICESAT

Data Collection: Work in Progress

- TERRA
 - CSP has collected development costs only.
- ICESAT
 - CSP has collected development and operations cost.

Data Collection: Future Work

- Future Activities
 - Update Phase I-III operations costs.
 - Define new missions for data collection (e.g. Earth science missions)
 - Seek new sources for funding data collection effort.

Ground Systems Modeling

Conversion of CSP Format to RAO Format

- **Ground System**
 - **Development Costs**
 - » Management
 - » Mission Planning
 - » Command Management
 - » Mission Control
 - » Data Capture
 - » Navigation
 - » Spacecraft Planning & Analysis
 - » Science Data Processing
 - » Data Archive
 - » Systems Engineering, I & T
 - » Computers & Communications
- **Mission Operations**
 - **Operations Costs**
 - » Management
 - » Mission Planning
 - » Command Management
 - » Mission Control
 - » Data Capture
 - » Navigation
 - » Spacecraft Planning & Analysis
 - » Science Data Processing
 - » Data Archive
 - » Systems Engineering, I & T
 - » Computers & Communications

Ground Systems Modeling

Conversion of CSP Format to RAO Format

- Science Calibration, Validation & Algorithms
 - Development Costs
 - » Science Planning & Analysis
 - Operations Costs
 - » Science Planning & Analysis
- Science Data Processing
 - Development Costs
 - » PI Science
 - » GO/GI Science
 - Operations Costs
 - » PI Science
 - » GO/GI Science

Ground Systems Modeling

Ground System Parameters

- MOS Approach & Architecture
 - Operations Approach
 - Tracking
 - Ground System Architecture & Heritage
- Technology
 - Technology Readiness Level (TRL)
 - Year of Technology
- Science Team Involvement
- Programmatic
 - Schedule
 - Management Mode for Ground System Development & Mission Operations

Ground Systems Modeling

Mission Parameters

- Mission Class/Reliability
 - Mission Science
 - Mission Class
 - Satellite Size
 - Mission Design Life
 - NASA Reliability Class
- Performance and Design Parameters
 - Orbit
 - Number of Instruments
 - Instrument Pointing Type
 - Pointing Accuracy
 - Data Processing
 - Frequency for Real-time Commands
 - Stabilization Type

Ground System Modeling

Ground System & Mission Parameters With Highest Correlations to Ground System Cost

- **Ground Systems Parameters**
 - Operations Approach
 - Tracking
 - Ground System Architecture & Heritage
 - Technology Readiness Level
 - Science Team Involvement
- **Mission Parameters**
 - Mission Class
 - Satellite Size
 - Mission Design Life
 - NASA Reliability Class
 - Maximum Downlink Rate